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EXAMINER	
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2633	17

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/474,299	SCHEMMANN ET AL.
	Examiner	Art Unit
	David S. Kim	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 06 January 2004.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) 5-8,13,14,17,18,20 and 22-27 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-4,9-12,15,16,19 and 21 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 29 December 1999 and 06 January 2004 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant presents an argument requesting the examination of the claims that were withdrawn in the previous Office Action (Paper No. 14, p. 3), **claims 5-8, 13-14, 17-18, 20, and 22-27**. Applicant states,

> "Regarding Claims 5-8, 13-14, 17-18, 20, and 22-27, Applicants submit that each of these Claims depend from one of already examined Claims 1-3, 10-11, 15, and 21. Therefore, Applicants submit it would not be a serious burden to examine dependent Claims 5-8, 13-14, 17-18, 20, and 22-27 and respectfully request these withdrawn claims be reinstated for examination" (Paper No. 16, p. 31, penultimate paragraph).

This is not found persuasive because an election of species requirement was made (Paper Nos. 7 and 9). That is, only the claims that read on the elected species are examined. The dependency of the claims is irrelevant. If any of the withdrawn claims 5-8, 13-14, 17-18, 20, and 22-27 read on the elected Species 4, examination would be appropriate for those claims. Aside from this general argument of claim dependency, no objective evidence has been presented to show how any of the withdrawn claims 5-8, 13-14, 17-18, 20, and 22-27 read on the elected Species 4. Regarding the burden to examine these withdrawn claims, the Office has already determined that Applicant's disclosure presents five patentably distinct inventions (five species, Paper Nos. 7 and 9). Consideration and examination of all five species would constitute consideration and examination of five patentably distinct inventions. Therefore, Examiner maintains that such consideration and examination would constitute undue burden. Thus, Applicant's argument is not found persuasive.

Additionally, the Office has already presented provisions for the consideration of these withdrawn claims. One provision is that

> "Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a)" (Paper Nos. 7 and 9).

Another provision is that

> "Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention" (Paper Nos. 7 and 9).

However, the first provision does not yet apply in view of the standing rejections. The second provision does not apply, as Applicant has not provided such evidence.

Summarily, Applicant's argument is not found persuasive, and the Office's provisions for the consideration of the withdrawn claims do not presently apply. Accordingly, the requirement is still deemed proper and is therefore made FINAL.

Drawings

2. The drawings were received on 06 January 2004. Applicant's compliance with the objections raised in the previous Office Action (Paper No. 14) is noted and appreciated. The correction regarding reference character "344" is acceptable. However, the drawings (those filed on 29 December 1999 and 06 January 2004) are still disapproved. Upon further review of the drawings and the specification together, the Office has noticed numerous instances of missing reference characters in the drawings, inaccurate reference characters, instances of missing reference characters in the specification, and conflicting usages of reference characters. Some examples include:

In Fig. 1, reference characters 116, 125, 126, 146, 161, 176, 177, 191, 192, 194, 195, 196, 197, 203, 207, 211, 212, 213, 217, and 218 are missing.

In Fig. 1, reference character 100 is missing from the specification.

In Fig. 5, reference characters 345, 365, and 369 each appear twice and refer to different objects.

In Fig. 8, reference character 557 is used where 607 may be intended. See p. 36, 3rd paragraph.

A thorough and careful review of the drawings and the specification together is strongly encouraged. Also, a proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. Applicant's compliance with the objections raised about the abstract in the previous Office Action (Paper No. 14) is noted and appreciated. While the length is now appropriate, the abstract is still objected to because "Ramon scattering" is used where "Raman scattering" may be intended.

4. Upon further review of the drawings and the specification together, the Office has noticed numerous instances of inaccurate reference characters, apparent misspellings, and incongruities with the drawings. Some examples include:

On p. 25, 1st full paragraph, "input optical path 174" is used where "input optical path 173" may be intended. See Fig. 1.

On p. 27, 3rd paragraph, "receivers end transmitters" is used where "receivers and transmitters" may be intended.

On p. 30, 4th paragraph, "precompensator 256" is used where "postcompensator 290" may be intended, and "power amplifier 298" is used where "power amplifier 296" may be intended. See Fig. 3.

A thorough and careful review of the drawings and the specification together is strongly encouraged.

Claim Objections

5. **Claim 2** is objected to because of the following informalities:

In claim 2, "between 1250 and 1360 nm or between 1500 and 1610 nm" is used where "between 1220 and 1360 nm or between 1480 and 1620 nm" may be intended. See Paper No. 16, p. 3, 1st paragraph; previous version of claims in original disclosure.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. **Claim 3** is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for "*two or more additional output optical paths configured to carry respective additional output light beams which are multicarrier optical output signals including a first additional output light beam...and a second additional output light beam...; the carrier frequencies of the first additional frequency band...; ...the carrier frequencies of the second additional frequency band...; ...so that the first and second additional frequency bands do not overlap*," does not reasonably provide enablement for "***one** or more additional output optical paths configured to carry respective additional output light beams which are multicarrier optical output signals **each** including a first additional output light beam...and a second additional output light beam...; the carrier frequencies of **each** the first additional frequency band**s**...; ...the carrier frequencies of the second additional frequency band**s**...; ...so that **a respective pair of** first and second additional frequency bands do not overlap*." The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

Fig. 1 shows "respective additional output light beams" on "additional output optical paths" 216-219. Each path carries one output light beam (or multicarrier optical output signal), and each path (or beam or multicarrier optical output signal) only includes **one** output light beam (specification, p. 25). However, claim 3 can be read such that each path (or beam or multicarrier optical output signal) includes a first and a second output light beam, **two** output light beams. As presently written, claim 3 does not enable the usage of the bolded, italicized text, as noted above.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Applicant's response to the rejections under 35 U.S.C. 112, second paragraph, presented in the previous Office Action (Paper No. 14) is noted and appreciated. However, **claim 10** is still rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 10, claim 10 appears to use awkward language construction. A portion of claim 10 reads,

"the maximum frequency of the first frequency band is one of

below 100 MHz <u>and the minimum frequency of the second band is above 200 MHz,</u>

below approximately 65 MHz <u>and the minimum frequency of the second band is above approximately 400 MHz,</u>

above approximately 5 MHz and below approximately 65 MHz, <u>and the first band width is more than 3 octaves, and the minimum frequency of the second band is approximately above 400 MHz and approximately below 650 MHZ, and the second band width is less than half an octave</u>" (Paper No. 16, p. 18).

While the italicized portion appears to read easily, the underlined portion appears to read awkwardly. For example, it is unclear how the "maximum frequency of the first frequency band" is equated to a particular range of frequencies **and** another limitation of another frequency band or another limitation regarding band width. The resulting claim does not **clearly** set forth the metes and bounds of the patent protection desired. As a suggestion, this claim could be revised such that one of these multiple cases is true, similar to the construction of the present version of claim 2 (Paper No. 16, p. 9).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. **Claims 1-4** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pidgeon (U.S. Patent No. 5,153,763).

Regarding claim 1, Pidgeon discloses:

Optical apparatus (hub version in col. 1, line 64 – col. 2, line 13), comprising:

an input path (input to transmitter 10 in Fig. 1) carrying an input carrier signal modulated by an information signal, the input carrier signal having a radio frequency (col. 3, lines 3-18);

an output optical path (output from transmitter 10 in Fig. 1) carrying an output light beam modulated by an output carrier signal modulated by the same information signal as the input carrier signal, the output carrier signal having a higher (col. 4, lines 1-23) radio frequency than the input carrier signal; and

up-converter means (Figs. 2-3) for converting the input carrier signal into the output light beam carrying the higher frequency output carrier signal, said converter means connecting said input path to said output path.

Pidgeon does not expressly disclose:

said input path being an optical path, said optical path carrying an input light beam modulated by said input carrier signal;

said up-converter means being an optical up-converter means for converting said input light beam.

However, optical paths, such as the fiber paths in Pidgeon (Figures), are extremely well known and common in the art. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to arrange said input path of the hub of Pidgeon to interface with the head end of Pidgeon via an optical path that carries an input light beam modulated by said input carrier signal. One of ordinary skill in the art would have been motivated to do this since doing so would enable well-known benefits of using an optical path from the head end to the hub of Pidgeon, such as low loss and high bandwidth (col. 1, lines 64-66). Accordingly, modified with such an input optical path, this input optical path would carry the input light beam to the input of the up-converter means in the hub of Pidgeon.

Additionally, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate arrange the up-converter means to include an optical receiver to convert the input light beam into a corresponding input electronic signal. One of ordinary skill in the art would have been motivated to do this in order to interface the input light beam with the up-converter means of Pidgeon (the apparatuses of Figs. 2-3 utilize input electronic signals). Modified as such, the up-converter means would convert said input light beam to said output light beam.

Regarding claim 2, Pidgeon discloses:

The apparatus of claim 1, further comprising:

an input coupler for connecting an input optical fiber to the input optical path; and an output coupler for connecting an output optical fiber to the output optical path (input and output couplers are conventional for connecting fibers and paths);

the optical apparatus further comprises one or more additional input optical paths (Note multiple input paths in Figs. 1 and 3. In view of the treatment of claim 1, multiple input paths correspond to multiple input optical paths.) providing a plurality of input optical paths carrying respective input light beams modulated by respective input carrier signals modulated by respective information signals, the respective input carrier signals having radio frequencies, wherein the optical up-converter means is configured to convert the plurality of the respective input light beams carrying the input carrier signals carrying the information signals into the output light beam carrying the higher frequency output carrier signals carrying the same information signals;

an output optical path (output from transmitter 10 in Fig. 1) configured to carry a respective output light beam modulated by respective output carrier signals modulated by the same information signals as corresponding input carrier signals, the respective output carrier signals having a higher radio frequency than the corresponding input carrier signals, wherein

the optical up-converter means is configured to convert the plurality of the input light beams carrying the input carrier signals carrying the information signals into the plurality of output light beams carrying the higher frequency output carrier signals carrying the same information signals, wherein

a wavelength of the input or output light beams is between 1250 and 1360 nm or between 1500 and 1610 nm (col. 3, lines 27-30), and one of the following conditions is true

a radio frequency of the output carrier signal is at least approximately 2 times higher than a radio frequency of the input carrier signal (Figs. 2-3),

the radio frequency of the input carrier signal is below 100 MHz (Figs. 2-3) and the radio frequency of the output carrier signal is above 200 MHz,

the radio frequency of the output carrier signal is between approximately 400 and 900 MHz (Figs. 2-3),

the radio frequency of the output carrier signal is more than approximately 40 times higher than the frequency of the input carrier signal, and

the radio frequency of the input carrier signal is approximately between 5 and 65 MHz and the radio frequency of the output carrier signal is at least 400 MHz (Figs. 2-3).

Pidgeon does not expressly disclose:

one or more additional output optical paths configured to carry respective output light beams.

However, it is well known and conventional for hubs to connect to more than one node. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to connect the hub of Pidgeon to more than one node. One of ordinary skill in the art would have been motivated to do this in order to increase the distribution reach of a CATV network. Accordingly, the optical apparatus in the hub of Pidgeon would comprise one or more additional output optical paths.

Regarding claim 3, Pidgeon discloses:

The apparatus of claim 1 in which:

the input and output light beams are multicarrier optical signals in which light beams are modulated by a respective multitude of carrier signals, the multitude carrier signals of the same light beam have mutually different radio frequency (col. 2, lines 15-42);

the carrier signals of the same light beam are modulated by different respective information signals (col. 2, lines 15-42);

the output carrier signals are modulated by the same respective information signals as corresponding input carrier signals having lower frequencies (col. 4, lines 1-31);

the output carrier signals have different respective radio frequencies all within a frequency band with a band width of approximately less than one octave (col. 4, lines 5-8), so that, the maximum frequency of a carrier in the band is less than or equal to approximately 2 times the minimum frequency of a carrier in the band, so that, essentially all second order distortions of the multicarrier signal can be filtered out (col. 4, lines 23-25);

the output carrier signals have radio frequencies within a frequency band with a width of approximately less than half an octave (col. 4, lines 56-62; note that 822 MHz – 654MHz = 168 MHz < 327 MHz = 654 MHz/2), so that, the maximum frequency of a carrier in the band is less than or equal to approximately 1.5 times the minimum frequency of a carrier in the band, so that, essentially all fourth order distortions of the multicarrier signal can be filtered out (col. 5, lines 3-5, "higher order harmonic distortion" includes fourth order distortions);

the multiple carrier signals of the input light beam have radio frequencies in a frequency band extending in a portion of the range between approximately 5 and 65 MHz and the corresponding carrier signals in the output light beam have radio frequencies in a band with a minimum carrier frequency above 400 MHz (Figs. 2-3);

the apparatus further comprises one or more additional output optical paths (output from combiners 54 and 56 in Fig. 3 and additional output paths, col. 4, lines 50-53) configured to carry respective additional output light beams which are multicarrier optical output signals including a first additional output light beam modulated by a multitude of carrier signals in a first additional frequency band (band out of laser diode transmitter 76 in Fig. 3) and a second additional output light beam modulated by a multitude of carrier signals in a second additional frequency band (band out of laser diode transmitter 64 in Fig. 3), and in which the frequency bands do not overlap;

the carrier frequencies of the first additional frequency band are selected from the group between approximately 200 MHz and approximately 800 MHz; and the carrier frequencies of the second additional frequency band are selected from the group between approximately 300 MHz and approximately 1200 MHz so that the first and second additional frequency bands do not overlap;

Pidgeon does not expressly disclose:

the wavelengths of two of the output light beams are separated by a difference between 0.4 nm and 1.6 nm.

However, this wavelength range is known to correspond to the wavelength spacing between WDM channels. WDM is an extremely well known and common transmission technique in the art. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to implement WDM techniques in the apparatus of Pidgeon. One of ordinary skill in the art would have been motivated to do this to multiplex different output light beams on one common fiber link instead of an individual fiber link for each output light beam, thus avoiding excess fiber installations, lowering fiber maintenance costs, and improving economical fiber bandwidth usage.

Regarding claim 4, Pidgeon discloses:

The apparatus of claim 1 in which:

the optical up-converter means includes:

optical receiver means (see treatment of claim 1) for converting the input light beam carrying the input carrier signal into an input electronic current signal carrying the same input carrier signal;

electronic up-converter means (Figs. 2-3) for converting the input electronic current signal modulated by the input carrier signal modulated by the information signal into an output electronic current signal modulated by the higher frequency output carrier signal modulated by the same information signal; and

optical transmitter means (transmitters in Figures) for converting the output electronic current signal carrying the higher frequency carrier signal into the output light beam carrying the same higher frequency output carrier signal.

13. **Claims 9-12, 15-16, 19, and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wright (U.S. Patent No. 5,841,468) in view of Pidgeon.

Regarding claim 9, Wright discloses:

The optical up-converter of Claim 1 (Optical apparatus, comprising:

an input optical path (input paths from subscribers to level 3 in Fig. 1; col. 5, lines 1-3, col. 11, lines 26-27) carrying an input light beam modulated by an input carrier signal modulated by an information signal, the input carrier signal having a radio frequency (col. 2, lines 3-7);

an output optical path (output paths from level 3 to level 2 in Fig. 1; col. 5, lines 1-3, col. 11, lines 26-27) carrying an output light beam modulated by an output carrier signal modulated by the same information signal as the input carrier signal, the output carrier signal having a higher (col. 4, lines 22-31, col. 9, lines 48-52) radio frequency than the input carrier signal; and

<u>optical upconverter means (up converters in Figs. 2A and 3) for converting the input light beam into the output light beam, said optical converter means connecting said input optical path to said output optical path),</u>

<u>further</u> comprising:

receiving means (frequency stackers 48 in Figures) for receiving a first plurality of multicarrier electronic first signals, each including a multitude of first carrier signals modulated by different respective information signals, the frequency of the carrier signals in the same multicarrier signal are all different, the frequencies of a plurality of the carrier signals of different first electronic signals are approximately the same, the first carrier signals of each first electronic signal being within the same first frequency band;

conversion means (up converters in Figures) for converting and combining the respective first signals into a single multicarrier electronic second signal including a multitude of second carrier signals of mutually different respective frequencies and modulated respectively by the same information signals as the first signals, the frequencies of the second carrier signals are within a second frequency band; and

transmission means (transmitter 50 in Figures) for transmitting the second signal.

Wright does not expressly disclose:

the maximum carrier frequency of the second band being at least 2 times higher than the maximum carrier frequency of the first band.

Pidgeon teaches a transmission method that incorporates frequency bands with such a relation (Pidgeon, abstract). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to implement the transmission method of Pidgeon to the up-converters of Wright. One of ordinary skill in the art would have been motivated to do this to reduce distortion (Pidgeon, abstract)

Regarding claim 10, Wright in view of Pidgeon discloses:

The optical up-converter of claim 9 in which:

the information signals of each first signal modulate respective second carrier signals with frequencies within a different subband of the second frequency band (Wright, col. 8, lines 46-48, col. 9, lines 48-52; Pidgeon, Figs. 2-3);

the frequency band width of the first frequency band is more than an octave (5-42 MHz > 3 octaves);

the frequency band width of the second frequency band is one of

less than an octave (Pidgeon, 654-1150 MHz < one octave), and

less than half an octave (Pidgeon, 654-822 MHz < half an octave, Wright in view of Pidgeon's 600 MHz local oscillator, 605-642 MHz < half an octave);

the minimum frequency of the second band is one of

more than the maximum frequency of the first band (Pidgeon, 654 MHz > Wright, 42 MHz),

more than 2 times higher than the maximum frequency of the first band (Pidgeon, 654 MHz > Wright, 84 MHz = 2 x 42 MHz), and

more than approximately 6 times higher than the maximum frequency of the first band (Pidgeon, 654 MHz > Wright, 252 MHz = 6 x 42 MHz); and

the maximum frequency of the first frequency band is one of

below 100 MHz (Wright, 42 MHz < 100 MHz) and the minimum frequency of the second band is above 200 MHz (Pidgeon, 654 MHz > 200 MHz);

below approximately 65 MHz (Wright, 42 MHz < 65 MHz) and the minimum frequency of the second band is above approximately 400 MHz (Pidgeon, 654 MHz > 400 MHz); and

above approximately 5 MHz and below approximately 65 MHz (Wright, 5 MHz < 42 MHz < 65 MHz), and the first band width is more than 3 octaves (Wright, 5-42 MHz

> 3 octaves), and the minimum frequency of the second band is approximately above 400 MHz and approximately below 650 MHz (Pidgeon, 400 MHz < Wright in view of Pidgeon's 600 MHz local oscillator, 605 MHz < 1000 MHz) and the second band width is less than half an octave (Pidgeon, 654-822 MHz < half an octave, Wright in view of Pidgeon's 600 MHz local oscillator, 605-642 MHz < half an octave).

Regarding claim 11, Wright in view of Pidgeon discloses:

The optical up-converter of claim 9 in which:

the receiving means (Figs. 2A and 3, col. 2, lines 21-41) communicates with respective coaxial cable networks to receive the first plurality of first electronic signals;

the conversion means includes a plurality of electronic frequency converters (up converters in Figs. 2A and 3, col. 4, lines 17-36) configured to convert the respective first electronic signals into different respective third multicarrier electronic signals, each of the third multicarrier electronic signals including a portion of the second carrier signals with frequencies within a subband of the second frequency band; and a combiner for combining the third electronic signals into the second electronic signal; and

the up-converter further comprises an optical transmitter for converting the single second electronic signal into a first multicarrier optical signal (col. 10, line 59 – col. 11, line 3).

Regarding claim 12, Wright in view of Pidgeon discloses:

The optical up-converter of claim 9 in which:

the up-converter further comprises an optical transmitter (transmitter 50 in Figures, col. 10, line 59 – col. 11, line 3) for converting the single second electronic signal into a first multicarrier optical signal; and

the conversion means includes:

first frequency converters (up converters in Figs. 2A and 3, col. 4, lines 17-36) for converting the respective first electronic signals into different respective third multicarrier

electronic signals, each including a multitude of third carrier signals, the frequencies of the third carrier signals of each third electronic signal being within a different subband of a third frequency band;

a combiner (note combined output from frequency stackers in Figs. 2A and 3) for combining the third electronic signals into a single fourth multicarrier electronic signal with third carrier signals in the third frequency band;

first optical transmitter (transmitter 50 in Figs. 2A and 3, col. 10, line 59 – col. 11, line 3) for converting the fourth electronic signal into a first multicarrier optical signal;

an optical receiver (receivers in Figs. 2B and 4) for converting the first optical signal into a fifth multicarrier electronic signal;

a second frequency converter (up converters in Figs. 2B and 4) for converting the fifth electronic signal into the second electronic signal with second carrier signals in the second frequency band (Pidgeon, Figs. 2-3); and

a second optical transmitter (transmitter 50 in Figs. 2B and 4, col. 10, line 59 – col. 11, line 3) for converting the single second signal into a second multicarrier optical signal.

Wright in view of Pidgeon does not expressly disclose:

the maximum frequency of the third frequency band being at least approximately the minimum frequency of the first frequency band plus the frequency band width of the first frequency band times the number of first multicarrier signals in the first plurality of signals; and

the minimum frequency of the second frequency band being higher than the maximum frequency of the third frequency band.

However, Pidgeon teaches the assignment of different frequency bands for different stages of transmission (Pidgeon, col. 4, lines 17-36, col. 7, lines 10-24). First, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to assign the maximum frequency of the third frequency band as written in claim 12. One of ordinary skill

in the art would have been motivated to do this so that the transmission stage associated with the third frequency band of Pidgeon would have enough bandwidth to accommodate all the incoming channels in the first plurality of signals. Second, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to assign the minimum frequency as written in claim 12. One of ordinary skill in the art would have been motivated to do this so that the frequency bands of the corresponding transmission stages do not overlap and interfere with each other. This kind of assignment of frequency bands leads to isolation of the signals as they progress upwardly through the network of Wright (col. 2, lines 17-36, col. 7, lines 10-24, col. 8, lines 16-31).

Regarding claim 15, Wright in view of Pidgeon discloses:

A hybrid cable fiber node (col. 2, lines 54-61) using the <u>optical</u> up-converter of claim 9, comprising:

an enclosure containing the apparatus of the node (service sites 16 in Fig. 1);

means for connecting a plurality of coaxial cable networks to the node (col. 2, lines 45-65);

up-converter means (up converters in Figs. 2A and 3, col. 4, lines 17-36) for receiving a plurality of multicarrier first electronic return signals from respective coaxial cable networks, the multicarrier signals each including a multitude of carrier signals modulated by different respective information signals, the frequency of each carrier signal in the same multicarrier signal being different, with frequencies of the carrier signals of all the first return signals being within the same first frequency band, and for converting the respective first electronic return signals into different respective second electronic return signals with frequencies of the carrier signals of each second return signal within a different subband of a second frequency band with a frequency band width that is less than one octave (Pidgeon, Figs. 2-3);

first electronic combining means (note combined output from frequency stackers in Figs. 2A and 3) for combining the second electronic return signals into a single third electronic return signal with frequencies of carrier signals within the second frequency band;

means for connecting a first optical fiber for carrying an optical signal from the node (Fig. 1, col. 2, lines 54-55); and

optical transmitter means (transmitter 50 in Figs. 2A and 3, col. 10, line 59 – col. 11, line 3) for converting the third electronic return signal into a first optical return signal.

Regarding claim 16, Wright in view of Pidgeon discloses:

The node of claim 15, in which:

the node further comprises: first optical receiver (receivers in Figs. 2A and 3) means for converting a forward optical signal into a respective electronic forward signal in one or more of the coaxial cable networks; and filter means (group transceivers 40 in Figs. 2A and 3) for separating the first electronic return optical signals from the electronic forward signals in respective coaxial cable networks and providing the first return signals to the up-converter means.

Regarding claim 19, Wright in view of Pidgeon discloses:

A method of providing optical communications, comprising the steps of

providing an electronic multicarrier communication signal (signal to transmitter 50 in Figs. 2A and 3);

converting (transmitter 50 in Figs. 2A and 3, col. 10, line 59 – col. 11, line 3, col. 4, lines 17-36) the multicarrier electronic communication signal into a first multicarrier optical communication signal including a multitude of carrier signals modulated by respective information signals, with the frequencies of the carrier signals different from each other and within a first frequency band; and

converting (Pidgeon, see treatment of claim 1 above) the first multicarrier optical signal into a second multicarrier optical signal including a multitude of carrier signals with frequencies in a second frequency band with a minimum frequency higher than a maximum frequency of the first frequency band.

Regarding claim 21, Wright in view of Pidgeon discloses:

The method of providing optical communications, of claim 19, comprising the steps of:

providing a respective multitude of customer interface units connected to each of a multitude of coaxial cable networks (Fig. 1, col. 5, lines 48-60);

generating a first electronic multicarrier signal in each of the coaxial cable networks (col. 1, lines 50-57), using the multitude of the customer interface units connected to each network, with the frequencies of carrier signals of the first electronic signal in each coaxial network in the same first frequency band (col. 2, lines 44-45);

providing one or more hybrid fiber cable nodes (Figs. 2A and 3, col. 5, lines 54-60);

providing one or more optical fibers (col. 5, lines 52-54);

converting one or more forward multicarrier optical signals from one of the optical fibers into forward multicarrier electronic signals in the coaxial cable networks (col. 5, lines 57-60);

separating the multitude of first electronic signals in the coaxial cable networks into a multitude of separated first electronic signals in the nodes (Fig. 1, col. 1, lines 37-39);

first converting (Pidgeon, Figs. 2-3) a first plurality of separated first electronic signals in the nodes into a single second electronic multicarrier signal with frequencies of carrier signals in a second frequency band having a minimum carrier frequency higher than a maximum carrier frequency of the first frequency band and a width of the second frequency band is less than one octave; and

second converting the second electronic signal into a first optical multicarrier signal (Pidgeon, transmitters in Figs. 2-3) in a first one of the optical fibers, with frequencies of carrier signals in the second frequency band.

Response to Arguments

14. Applicant's amendments to the claims have been fully considered but still do not overcome the prior art of record presented in the previous Office Action (Paper No. 14). The amendments change the scope of the rejected claims (in particular, claims 1-3 and 9-10), and new grounds of rejection, based on the same prior art of record, are presented to respond to these changes in the scope of the rejected claims, accordingly.

15. Applicant's arguments filed 06 January 2004 have been fully considered but they are not persuasive. Applicant presents two points.

Regarding the first point, in response to Applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which Applicant relies (i.e., "*feedback from the consumer nodes to the head node*" (Paper No. 16, p. 32, 2nd paragraph)) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Thus, Applicant's first point is not persuasive.

Regarding the second point, Applicant states,

> "Furthermore, contrary to the Official Action, the distortion system of Pidgeon is not an optical upconverter at least because the distortion system of Pidgeon converts *RF-to-optical-to-RF*. An optical upconverter converts *optical-to-RF-to-optical*, where the frequency of the carrier signals associated with the optical signal output from the optical converter is higher than the frequency of the carrier signals associated with the optical signal input to the optical converter. Applicants have also considered the Wright reference and submit that Wright does not cure the deficiencies of Pidgeon" (Paper No. 16, p. 32, 2nd paragraph).

Examiner respectfully disagrees. An obviousness case had been made (Paper No. 14, p. 7-8) and still stands (see treatment of claim 1 above) such that Applicant's definition of an optical upconverter is unpatentable in view of Pidgeon. Other than Applicant's statement above, Applicant does not provide objective evidence against this obviousness case. Additionally, Wright teaches such an optical upconverter (see treatment of claim 9 above). Thus, Applicant's second point is not persuasive.

Summarily, Applicant's arguments are not persuasive, and Examiner respectfully maintains the standing rejections.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 703-305-6457. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DSK

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